Remarks

Claim 1 is pending in the subject application. By this Amendment, Applicant has amended claim 1. Amendment to Claim 1 is supported by the Specification at page 5, lines 23 and 28, and page 7, line 27. No new matter is involved.

The subject specification has been objected to on the grounds that it does not comply with 37 CFR §1.821(a)(1) and (a)(2) which requires a reference to a particular sequence identifier (SEQ ID NO:). Specifically, the Examiner makes reference to the brief description of Figures 1 and 3 on page 6, as well as lines 12-13 at page 12 of the subject specification wherein a sequence identifier has not been included for sequences referred to in those instances. By this Amendment, Applicant has amended the subject specification to include the SEQ ID NO: associated with Figures 1 and 3 as well as those referred to at page 12 of the specification. Accordingly, reconsideration and withdrawal of the objection is respectfully requested.

§112 Written Description Rejections

Claim 1 has been rejected for failing to comply with the written description requirement of 35 USC §112, first paragraph, for two reasons:

a. there is purportedly no written support for the term "or an analog of the magainin family" and

b. the claim purportedly encompasses subject matter not described in the Specification in a manner that shows the inventor had possession of the claimed invention.

These rejections are respectfully traversed.

The "new matter" rejection is deemed moot in view of the above amendment.

The "overly broad" rejection is also deemed moot in view of the above amendment to Claim 1 and the following remarks. Plastid transformation vectors were well known in the art at the time the present application was filed and are further described in detail in the present Specification. Basically, a plastid transformation vector contains (a) an expression cassette comprising a plastid promoter, a selectable marker sequence, a coding sequence for a gene of interest (in this case a magainin or magainin analog coding sequence), termination sequences and (b) flanking each side of the expression cassette, plastid DNA that is homologous to the plastid genome. The flanking plastid

DNA causes the expression cassette to be inserted into the plastid genome by homologous recombination. Petunia flanking regions were used with the expression cassette containing a coding region for MSI-99 as described in detail in the Specification. The transformation of tobacco employing the petunia flanking regions is described as well. The Specification then directs one of ordinary skill in the art to use tobacco flanking regions which were well known to a skilled artisan as of the filing date. Tobacco flanking regions are also described in detail in the Specification.

In view of the above, it is readily seen that the presently amended Claim 1 complies with the written description requirement of 35 USC 112, first paragraph. Withdrawal of this rejection is respectfully solicited.

§112 Enablement Rejection

Claim 1 has been rejected under 35 USC 112, first paragraph, for being non-enabling. Specifically, the Examiner has stated that the only example given is tobacco transformation of the magainin analog peptide MSI-99 and that Claim 1 broadly covers "any cytotoxic antimicrobial peptide." This rejection is respectfully traversed.

First, the presently pending Claim 1 is not directed to "any cytotoxic antimicrobial peptide" but rather is limited to cytotoxic antimicrobial magainin family peptides or a magainin analog. For this reason alone the rejection should be withdrawn. Since the present claim is so limited, it is certainly enabled seeing the example given is a magainin analog (MSI-99).

Second, each of the references cited by the Examiner (Okamato *et al.*, Allefs *et al.*, Hightower *et al.* and De Bolle *et al.*) involved nuclear transformation and *Agrobacterium* transformation. The presently claimed invention however is directed to **plastid transformation** of plants with a magainin family peptide or magainin analog. As taught in the present Specification the plastid transformation with a magainin family peptide or magainin analog avoids the problems associated with the prior art nuclear transformation of cytotoxic antimicrobial peptides. This is an argument for patentability as described in the 103(a) section below.

Reconsideration and withdrawal of this rejection is respectfully requested.

§112 Indefiniteness Rejection

Claim 1 has been rejected under 35 USC 112, second paragraph, for being indefinite because of the use of the term "analog of the magainin family" in Claim 1. This rejection is deemed moot in view of the above amendment where this term has been removed from the claim and changed to language that is fully supported by the Specification. Withdrawal of this indefiniteness rejection is respectfully solicited.

§103(a) Obviousness Rejection

Claim 1 has been rejected under 35 USC(a) as being obvious in view of (1) Maliga '402 in view of Davies et al WO90/11770 and (2) Maliga '402 in view of Smith *et al.* WO 99/06564. These rejections are respectfully traversed.

While Maliga '402 discloses plastid transformation, Davies *et al.* is limited to nuclear transformation. As stated in the Specification of the present application, it was not obvious to engineer the plastid genome to confer disease resistance. There are no prior reports or suggestions in the literature that the plastid genome could be engineered to confer disease resistance. Also, it is known in the art that antimicrobial peptides are toxic to plant chloroplasts because of the charge on the chloroplast membranes. Thus, the present invention confirms a novel and unobvious solution to combat phytopathogens that was previously unknown and contrary to all current understanding of chloroplast biology. Most importantly, small peptides are not stable inside living cells and are highly susceptible to proteolytic degradation. For this reason, small peptides are usually produced as fusion proteins with larger peptides in biological systems. Megainin-type peptides are chemically synthesized and never made in biological systems for that reason. Therefore, it was not obvious to express a small peptide of a few amino acids within plastids. For the above reasons the present obviousness rejection based on Maliga '402 in view of Davies *et al.* should not be maintained. Reconsideration and withdrawal of this rejection is respectfully requested.

The obviousness rejection based on Maliga '402 in view of the Smith *et al.* publication also should not be maintained. Smith *et al.* provide examples based on nuclear transformation and not plastid transformation. While Smith *et al.* may suggest plastid transformation, they do not appreciate the unexpected advantages disclosed by the presently claimed invention as described above. To

support an obviousness rejection, one must find both the suggestion, and the expectation of success, in the prior art. *In re Dow Chemical Co.*, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). Maliga '402 in combination with Smith *et al.* do not provide the requisite expectation of success of actually transforming and expressing a magainin family peptide in the chloroplast compartment. Reconsideration and withdrawal of this rejection is respectfully requested.

It should be understood that the amendments presented herein have been made solely to expedite prosecution of the subject application to completion and should not be construed as an indication of Applicant's agreement with or acquiescence in the Examiner's position. Applicant expressly reserves the right to pursue the invention(s) disclosed in the subject application, including any subject matter canceled or not pursued during prosecution of the subject application, in a related application.

In view of the foregoing remarks and amendments to the claims, Applicant believes that the currently pending claims are in condition for allowance, and such action is respectfully requested.

The Commissioner is hereby authorized to charge any fees under 37 CFR §§1.16 or 1.17 as required by this paper to Deposit Account No. 19-0065.

Applicant invites the Examiner to call the undersigned if clarification is needed on any of this response, or if the Examiner believes a telephonic interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

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JL/amh
Attachment: Petition and Fee for Extension of Time